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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,880	11/05/2001	James D. Beasom	125.014US01	7668

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EXAMINER

PHAM, HOAI V

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 06/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/992,880

Applicant(s)

JAMES D. BEASOM

Examiner

Hoai V Pham

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- In order to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 March 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 6 and 7 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33-37 is/are allowed.
- 6) ☐ Claim(s) 1-5, 8-17, 20 and 23-29 is/are rejected.
- 7) ☐ Claim(s) 18, 19, 21, 22 and 30-32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election of claims 1-5 and 8-37 in Paper No. 4 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 13, 14, 27 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13, lines 3-4, "device regions formed in the substrate" renders the claim indefinite. It is unclear what "device regions formed in the substrate" is referring to.

Claim 27, line 2, "the semiconductor adjacent device regions" renders the claim indefinite. It is unclear what "the semiconductor adjacent device regions" is referring to.

Claim 28, line 1, "the etchant" renders the claim indefinite. It is unclear what "the etchant" is used to etch what layers.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 10-12, 15-17, 20, 23, 24, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang et al. [U.S. Pat. 5,792,681].

With respect to claim 10, Chang et al. (figs. 1-10, cols. 3-5) a method of forming an integrated circuit, the method comprising:

forming an oxide layer (7) on a surface of a substrate (1), the substrate having a plurality of isolation islands, wherein at least one isolation island is used in forming a semiconductor device;

patterning the oxide layer to expose predetermined areas of the surface of the substrate (see fig. 4);

depositing a nitride layer (14) overlaying the oxide layer and the exposed surface areas of the substrate; and

implanting ions (16a) through the nitride layer, wherein the nitride layer is an implant screen for the implanted ions.

With respect to claim 11, Chang et al. discloses diffusing the ions to form device regions (16b) in selected isolation islands in the substrate (see fig. 8).

With respect to claim 12, Chang et al. discloses using the nitride layer in at least one of the isolation islands as a capacitor dielectric in forming a capacitor (5) (see fig. 8).

With respect to claim 15, Chang et al. (figs. 1-10, cols. 3-5) a method of forming an integrated circuit, the method comprising:

forming an oxide layer (7) on a surface of a substrate (1), the substrate having a plurality of isolation islands, wherein at least one isolation island is used in forming a semiconductor device of the integrated circuit;

patterning the oxide layer to expose predetermined areas of the surface of the substrate (see fig. 4);

depositing a dielectric layer (14) overlaying the oxide layer and the exposed surface areas of the substrate, wherein the dielectric layer has a higher dielectric constant than a dielectric constant of the oxide layer;

implanting ions (16a) through the dielectric layer;

diffusing the ions to form device regions (16b) in selected isolation islands in the substrate; and

using the dielectric layer in at least one of the isolation islands as a capacitor dielectric in forming a capacitor (5) (see fig. 8).

With respect to claim 16, Chang et al. discloses that the capacitor dielectric layer (14) is a layer of silicon nitride.

With respect to claim 17, Chang et al. discloses forming contact openings to the device regions (see fig. 9).

With respect to claim 20, Chang et al. discloses depositing a layer of metal (20a) overlaying the layer of nitride and the exposed device regions through the contact openings; and patterning the layer of metal contacts to form metal contact regions for each contact opening (see fig. 10).

With respect to claim 23, Chang et al. (figs. 1-10, cols. 3-5) discloses a method of forming an integrated circuit, the method comprising:

forming a first oxide layer (7) on a surface of a substrate (1), the substrate having a plurality of isolation islands, wherein at least one isolation island is used in forming a semiconductor device of the integrated circuit;

patterning the first oxide layer to expose predetermined areas of the surface of the substrate (see fig. 4);

implanting and diffusing ions (13a) into the substrate to form device regions(13b) (see fig. 5-6);

forming a dielectric layer (14) overlaying the oxide layer and the exposed areas of the surface of the substrate, wherein the dielectric layer has a dielectric constant higher than a dielectric constant of the oxide layer; and

using the dielectric layer in at least one of the isolation islands as a capacitor dielectric in forming a capacitor (5) (see fig. 6).

With respect to claim 24, Chang et al. discloses that the dielectric layer is a nitride layer formed by low pressure chemical vapor deposition (see col. 4, lines 42-45).

With respect to claim 29, Chang et al. discloses forming contact openings to the device regions (see fig. 9).

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

7. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 1-5, 8 and 9 are rejected under 35 U.S.C. 102(e) as being Liaw by [U.S. Pat. 6,258,678].

Liaw (figs. 1-8, cols. 3-5) discloses a method of forming a contact opening through a dielectric layer (6) overlaying an oxide layer (8) in an integrated circuit, the method comprising:

forming a layer of mask material (13) overlaying the dielectric layer;

patterning the layer of mask material to expose a pre-selected portion of the dielectric layer; and

forming anisotropic contact openings (14a) that extend through the layer of dielectric and the layer of oxide using a dry etch with a single mask.

With respect to claim 2, Liaw discloses removing the layer of mask material (see fig. 7).

With respect to claim 3, Liaw discloses that the mask material is photo resist mask material (see col. 5, lines 8-9).

With respect to claim 4, Liaw discloses that the patterning of the layer of mask material further comprises: removing a portion of the mask material adjacent a portion of the dielectric layer where the contact opening is to be formed (see fig. 5).

With respect to claim 5, Liaw discloses that the dry etch used is a reactive ion dry etch (see col. 5, lines 10+).

With respect to claims 8 and 9, Liaw discloses that the dielectric constant of the dielectric layer is higher than the dielectric constant of the layer of oxide and wherein the dielectric is silicon nitride (see col. 3, lines 55+).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 25 and 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. [U.S. Pat. 5,792,681].

Chang et al. fails to show using open tube deposition as a dopant source to form the device regions, wherein the dopant source is phosphorus oxychloride. However, using open tube deposition is well known method and phosphorus oxychloride is well

known material. Therefore, it would have been obvious to the skilled in the art to use open tube deposition method and phosphorus oxychloride in the Chang et al.

Allowable Subject Matter

11. Claims 33-37 are allowed.
12. Claims 18, 19, 21, 22, and 30-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
13. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to disclose diffusing the dopants to form a bottom plate in the capacitor isolation island and an emitter and collector contact in the transistor isolation island.

Conclusion

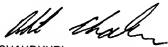
14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoai V Pham whose telephone number is 703-308-6173. The examiner can normally be reached on 6:30A.M. - 6:00P.M..
15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

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16. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

HP
Hoai Pham
May 29, 2002


OLIK CHAUDHURI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800